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BIOLOGY

Morphology of Flowering Plants

Q.1 **Fibrous roots develop in maize from**

(a) upper nodes (b) base of stem

(c) upper internodes (d) none of these

Q.2 **Identify the wrong statements for seed from given statements.**

(i) **The embryo is made up of an embryonal axis and one cotyledons in gram and two cotyledons in pea.**

(ii) **The ovules after fertilisation, develop into seeds.**

(iii) **The seed coat has two layers, the outer testa and the inner tegmen.**

(iv) **The hilum is a scar on the seed coat through which the developing seeds were attached to the fruit.**

(v) **Seeds of castor is non-endospermic while seed of bean, gram and pea is endospermic.**

(a) (i) and (iii) (b) (ii), (iv) and (v)

(c) (iii) and (iv) (d) (i) and (v)

Q.3 **Statement I :** Cells of meristematic region of roots are very small, thick walled and with dense protoplasm.

Statement II : These cells divide repeatedly.

(a) Both statements are correct.

(b) Statement I is correct & II is incorrect.

(c) Statement I is incorrect & II is correct.

(d) Both statements are incorrect.

Q.4 **Statement I :** Apocarpous condition is present in lotus and rose.

Statement II : When stamens are attached to the perianth, they are epiphyllous.

(a) Both statements are correct.

(b) Statement I is correct & II is incorrect.

(c) Statement I is incorrect & II is correct.

(d) Both statements are incorrect.

Q.5 **Which one of the following statements is correct?**

(a) Bulb of Onion is a modified stem.

(b) Cloves of Garlic are fleshy scale leaves.

(c) Corm of *Colocasia* is a modified root.

(d) Tendril in Pea is a modified axillary bud.

Q.6 **Which one of the following statements is not correct?**

(a) Each stamen which represents the male reproductive organ consists of a stalk or a filament and an anther.

(b) An actinomorphic flower can be dissected into two equal halves from any plane.

(c) Superior ovary is found in hypogynous flowers.

(d) When stamens are attached to petals, they are epiphyllous as in brinjal.

Q.7 **Which of the following statement(s) is/are correct about calyx?**

(a) Calyx is the outermost whorl of the flower and are called sepals.

(b) Sepals are green, leaf like structure and protect the flower in the bud stage.

(c) The calyx may be gamosepalous (sepals free) or polysepalous (sepals united).

(d) Both (a) and (b)

Q.8 **Match column-I containing types of aestivation with their examples given in column-II and choose the correct option.**

Column - I (Type of aestivation)	**Column-II (Examples)**
A. Valvate	**I. Cotton**
B. Twisted	**II. *Calotropis***
C. Imbricate	**III. Bean**
D. Vexillary	**IV. Gulmohar**

(a) A – I; B – II; C – IV; D – III

(b) A – II; B – I; C – IV; D – III

(c) A – II; B – IV; C – I; D – III

(d) A – II; B – I; C – III; D – IV

Q.9 **Assertion :** Neem and silk cotton have compound leaf.

Reason : In compound leaf incisions of the lamina reach up to the midrib breaking it into a number of leaflets.

(a) Assertion and reason both are true and the reason is correct explanation of assertion.

(b) Assertion and reason both are true but reason is not correct explanation of assertion.

(c) Assertion is true but reason is wrong.

(d) Assertion and reason both are wrong.

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Q.10 **Match the following stem modifications given in column I with their examples given in column II and select the correct combination from the options given below.**

Column-I (Stem Modifications)	Column-II (Found in)
A. Underground stem	I. Euphorbia
B. Stem tendril	II. Opuntia
C. Stem thorns	III. Potato
D. Flattened stem	IV. Citrus
E. Fleshy cylindrical stem	V. Cucumber

(a) A – I, B – II, C – III, D – V, E – IV

(b) A – II, B – III, C – IV, D – V, E – I

(c) A – III, B – IV, C – V, D – I, E – II

(d) A – III, B – V, C – IV, D – II, E – I

Q.11 **Read the following statements and answer the question.**

(i) It is the pattern of arrangement of leaves on the stem or branch.

(ii) It is usually of three types - alternate, opposite and whorled.

(iii) It is meant for getting maximum amount of light.

Which condition of plant is being described by the above statements?

(a) Phyllotaxy (b) Venation

(c) Inflorescencew (d) Aestivation

Q.12 **Which of the following statement(s) is/are correct about the fruit?**

(i) Fruit is a mature or ripened ovary, developed before fertilization.

(ii) It consists of a wall or pericarp and seeds.

(iii) When pericarp is thick and fleshy, it is differentiated into outer mesocarp, middle epicarp and inner endocarp.

(iv) In mango and coconut, the fruit is known as a berry.

(a) Only (i)

(b) Both (ii) and (iii)

(c) Only (ii)

(d) All of these

Q.13 **Which of the following statement(s) is /are correct?**

(i) Many plants belonging to the family fabaceae are good ornamentals (*Tulip, Gloriosa*), source of medicine (*Aloe*) and vegetables (*Asparagus*).

(ii) The plumule and radicle are enclosed in sheaths which are called coleorhiza and coleoptile respectively.

(iii) A flower having either stamens or carpels is unisexual.

(iv) Basal, alternate, linear, exstipulate with parallel venation types of leaves is found in the family liliaceae.

(a) Only (i) (b) Both (i) and (ii)

(c) Both (iii) and (iv) (d) All of these

Q.14 **Which of the following statements is correct?**

(a) Imbricate aestivation is found in the papilionaceous family.

(b) Generally, sepals are green, leaf like and protect the flowers in the bud stage.

(c) In cymose type of inflorescence, the main axis terminates in a flower, hence is limitless in growth.

(d) In axile placentation ovary is one chambered but it becomes two cambered due to the formation of false septum.

Q.15 **Match column-I with column-II and choose the correct option.**

Column-I (Members of Fabaceae)	Column-II (Economic importance)
A. Gram, sem, moong, soyabean	I. Medicine
B. Soyabean,groundnut	II. Ornamental
C. Indigofera	III. Fodder
D. Sunhemp	IV. Fibres
E. Sesbania, Trifolium	V. Dye
F. Lupin, sweet potato	VI. Edible oil
G. Mulethi	VII. Pulses

(a) A–I, B–II, C–III, D–IV, E–V, F–VI, G–VII

(b) A–VII, B–VI, C–V, D–IV, E–III, F–II, G–I

(c) A–II, B–IV, C–VI, D–I, E–III, F–V, G–VII

(d) A–I, B–III, C–V, D–VII, E–II, F–IV, G–VI

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Q.16 **The mature seeds of plants such as gram and peas, possess no endosperm, because**

(a) These plants are not angiosperms

(b) There is no double fertilization in them

(c) Endosperm is not formed in them

(d) Endosperm gets used up by the developing embryo during seed development

Q.17 **Assertion :** In fabaceae family monocarpellary, unilocular ovary is present.

Reason : In fabaceae, placentation is parietal.

(a) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.

(b) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

Q.18 **Family Fabaceae differs from Solanaceae and Liliacee. With respect to the stamens, pick out the characteristic specific to family Fabaseae but not found in Solanaceae or Liliaceae.**

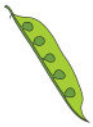
(a) Monoadelphous and Monothecous anthers

(b) Epiphyllous and Dithecous anthers

(c) Diadelphous and Dithecous anthers

(d) Polyadelphous and epipetalous stamens

Q.19 **Match column - I, II and III and choose the correct option.**

Column-I	Column-II	Column-III
A. Marginal	I.	p. Sunflower, Marigold
B. Axile	II.	q. Dianthus, Primrose
C. Parietal	III.	r. Mustard, Argemone
D. Free central	IV.	s. China rose, tomato, lemon
E. Basal	V. 	t. Pea

(a) A - V, t; B - II, s; C -I, r; D -III, q; E -IV, p

(b) A - I, t; B - II, s; C - III, r; D - IV, p; E - V, q

(c) A - V, p; B - II, s; C - I, q; D - III, r; E - IV, t

(d) A - V, p; B - III, q; C - II, s; D - I, t; E - IV, r

Q.20 **Match the column I with column II and choose the correct option.**

Column I	Column II
A. Placentation	(i) Arrangement of flowers on the rachis
B. Aestivation	(ii) Modified shoot for sexual reproduction
C. Inflorescence	(iii) Arrangement of various whorls in the bud
D. Flower	(iv) Arrangement of ovules within an ovary

	A	B	C	D
(a)	(i)	(ii)	(iii)	(iv)
(b)	(iii)	(i)	(ii)	(iv)
(c)	(iii)	(i)	(iv)	(ii)
(d)	(iv)	(iii)	(i)	(ii)

Q.21 **Identify the kind of phyllotaxy shown in the given figures A, B, and C.**

A B C

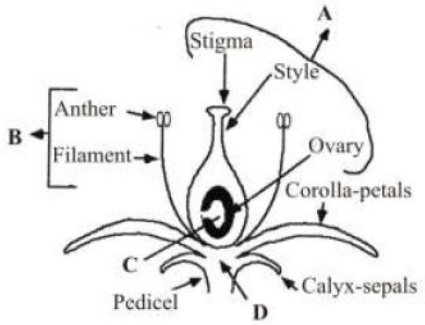
(a) A-Alternate, B - Opposite, C - Whorled

(b) A- Whorled, B - Opposite, C -Alternate

(c) A-Alternate, B - Whorled, C - Opposite

(d) A-Whorled, B -Alternate, C - Opposite

Q.22 **Which one of the following options shows the correct labelling of the structure marked as A, B, C & D?**



	A	B	C	D
(a)	Gynoecium	Megasporophyll	Ovule	Thalamus
(b)	Gynoecium	Stamen	Seed	Thalamus
(c)	Microsporophyll	Stamen	Ovule	Thalamus
(d)	Gynoecium	Stamen	Ovule	Thalamus

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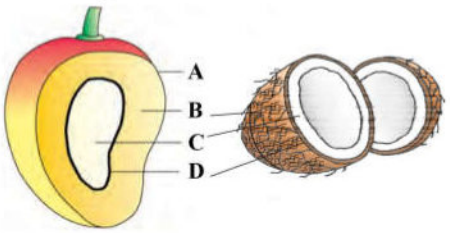
Q.23 **The given figure shows the parts of mango and coconut. Choose the option which shows the correct labelling of A, B, C and D marked in the figures.**



	A	B	C	D
(a)	Epicarp,	Mesocarp,	Seed,	Endocarp
(b)	Epicarp,	Mesocarp,	Ovule,	Endocarp
(c)	Epicarp,	Mesocarp,	Ovary,	Endocarp
(d)	Epicarp,	Mesocarp,	Embryo,	Endocarp

Q.24 **Which of the following is a modified stem for the protection of plants from browsing animals?**

(a) Tendrils (b) Thorns
(c) Rhizome (d) Tuber

Q.25 **A branch in which each node bearing a rossette of leaves and a tuft of roots is found in aquatic plants like _____ and _____.**

(a) *Hydrilla* and *Pistia*
(b) *Eichhornia* and *Hydrilla*
(c) *Pistia* and *Eichhornia*
(d) *Pistia* and *Vallisneria*

Q.26 **In which of the following plants, a slender lateral branch arises from the base of the main axis, and after growing aerially arch downwards to touch the ground?**

(a) Mint and jasmine (b) Banana and pineapple
(c) Grass and stawberry (d) *Pistia* and *Eichhornia*

Q.27 **Which of the following is the green expanded part of leaf with vein and veinlets?**

(a) Petiole (b) Node
(c) Stipule (d) Lamina

Q.28 **Which of the following statement(s) is/are correct about venation?**

(i) The arrangement of veins and the veinlets in the lamina of leaf is called venation.
(ii) Reticulate venation is the characteristic of monocots.
(iii) When the veinlets form a network, the venation is termed as reticulate venation.
(iv) When the veins run parallel to each other within a lamina, the venation is termed as parallel venation.

(a) Only (i) (b) Both (i) and (ii)
(c) (i), (iii) and (iv) (d) All of these

Q.29 **Which one of the following are not true for parietal placentation?**

(a) Ovules are borne on central axis.
(b) Ovary is one-chambered but it becomes two chambered due to the formation of false septum.
(c) Examples are mustard and *Argemone*.
(d) Both (b) and (c)

Q.30 **Which one of the following characteristics is not related to gynoecium?**

(a) It is the female reproductive part of the flower.
(b) It is composed of stamens.
(c) Stigma is usually at the tip of the style and is the receptive surface for pollen grains.
(d) Each ovary bears one or more ovules attached to a flattened, cushion like placenta.

Q.31 **Study the following statements and select the correct option**

(i) Buds are present in the axil of leaflets of the compound leaf.
(ii) Pulvinus leaf-base is present in some leguminous plants.
(iii) In *Alstonia*, the petioles expand, become green and synthesize food.
(iv) Opposite phyllotaxy is seen in guava.

(a) (ii) and (iv) are correct but (i) and (iii) are incorrect.
(b) (i) and (iii) are correct but (ii) and (iv) are incorrect.
(c) (i) and (iv) are correct but (ii) and (iii) are incorrect.
(d) (ii), (iii) and (iv) are correct but (i) is incorrect.

Q.32 **Which of the following statements are correct?**

(i) From the region of elongation, some of the epidermal cells form root hairs.
(ii) Pneumatophores are seen in Rhizophora.
(iii) Adventitious roots are seen in the banyan tree.
(iv) Maize and sugarcane have prop roots.

(a) (i) and (iv)
(b) (i), (iii) and (iv)
(c) (iii) and (iv)
(d) (ii) and (iii)

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Q.33 Match column I with column II and choose the correct option.

Column-I	Column-II
A. Bud in the axil of leaf	I. Pitcher plant and venus fly trap
B. Outer layer of seed coat	II. Cacti
C. Spines (modified leaves)	III. Testa
D. Leaves modified to catch insects	IV. Simple leaf
E. Fleshy leaves with stored food	V. Garlic and onion

(a) A – I, B – II, C – III, D – IV, E – V
(b) A – V, B – IV, C – III, D – II, E – I
(c) A – IV, B – III, C – II, D – I, E – V
(d) A – IV, B – II, C – III, D – I, E – V

Q.34 A sterile stamen is known as
(a) staminode (b) anther
(c) pollen grain (d) filament

Q.35 Pollen grains are produced within the _____ of stamen.
(a) ovary (b) anther
(c) filament (d) connective

Q.36 Which one of the following structure is not associated with gynoecium?
(a) Ovary (b) Style
(c) Stigma (d) Filament

Q.37 During the post-fertilization period, the ovules develop into ___A _____ and the ovary matures into a ___B ____.
(a) A - seeds; B - fruit (b) A - fruit; B - seeds
(c) A - flower; B - seed (d) A - seeds; B - flower

Q.38 A scar on the seed coat through which the developing seeds are attached to the fruit is called as _____.
(a) testa (b) tegmen
(c) hilum (d) micropyle

Q.39 Floral formula of tomato/tobacco is
(a) $\oplus \female \overline{K}_{4-5}A_{10}\underline{G}_{(2)}$ (b) $\oplus \female \overline{K}_{2+2}C_4A_{2+4}\underline{G}_1$
(c) $\oplus \female \overline{P}_2A_3\underline{G}_1$ (d) $\oplus \female \overline{K}_{(5)}\widehat{C_{(5)}A_5}\underline{G}_{(2)}$

Q.40 Consider the following statements regarding the root system of angiosperms and choose the correct option given below.
(i) In monocots, the fibrous root system arises from the base of the stem.
(ii) The region of elongation is called the root hair region.
(iii) In sweet potato, the adventitious roots get swollen and store food.
(iv) The stems of maize and sugarcane have supporting roots called prop roots.
(a) (i) and (ii) are correct but (iii) and (iv) are wrong.
(b) (ii) and (iii) are correct but (i) and (iv) are wrong.
(c) (ii) and (iv) are correct but (i) and (iii) are wrong.
(d) (i) and (iii) are correct but (ii) and (iv) are wrong.

Q.41 Which of the following statement (s) is/are not correct?
(i) Calyx and corolla are reproductive organs of a flower.
(ii) Zygomorphic flower can be divided into two equal radial halves in any radial plane.
(iii) Flowers without bracts are termed as bracteate.
(iv) Parthenocarpic fruit is formed after fertilization of the ovary.
(v) In legumes, seed is non-endospermic.
(vi) Radical buds develop on roots.
(a) (i) , (ii), (iii) and (iv) (b) (i), (ii) and (v)
(c) (iii), (iv) and (vi) (d) (iv), (v) and (i)

Q.42 Which of the following statements are correct about the leaf?
(i) Leaf is a lateral, generally flattened structure borne on the stem.
(ii) It develops at the node and bears a bud in its axil.
(iii) Leaves originate from root apical meristems and arranged in an acropetal order.
(iv) They are the most important vegetative organs for reproduction.
(a) (i) and (ii) (b) (ii) and (iii)
(c) (i), (ii) and (iv) (d) all of these

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Q.43 **Read the following statements and answer the question.**

(i) Gynoecium is situated in the centre, and other parts of the flower are located on the rim of the thalamus almost at the same level.

(ii) Ovary is half-inferior.

(iii) Examples are plum, rose and peach.

Which condition of flowers is being described by the above statements ?

(a) hypogyny (b) perigyny

(c) epigyny (d) none of these

Q.44 **Match the andsoecium formula (given in column II) with their family (given in column I) and choose the correct combination from the options given below.**

Column-I (Family)	Column-II (Androecium formula)
A. Brassicaceae	I. A_{3+3}
B. Fabaceae	II. $A_{(5)}$
C. Solanaceae	III. $A_{(9)+1}$
D. Liliaceae	IV. A_{2+4}

(a) A – IV; B – III; C – II; D – I

(b) A – I; B – II; C – III; D – IV

(c) A – II; B – III; C – IV; D – I

(d) A – III; B – IV; C – I; D – II

Q.45 **Match column I with column II and choose the correct combination from the options given below.**

Column-I (Position of floral parts on thalamus)	Column-II (Represented in)
A. Hypogynous	I. Ray florets of sunflower
B. Perigynous	II. Brinjal
C Epigynous	III. Peach

(a) A – II, B – I, C – III

(b) A – I, B – II, C – III

(c) A – III, B – II, C – I

(d) A – II, B – III, C – I

Q.46 **Assertion :** Leaf are converted into tendrils for climbing as in pea or into spines for defence as in cacti.

Reason : Leaves are often modified to perform functions other than photosynthesis.

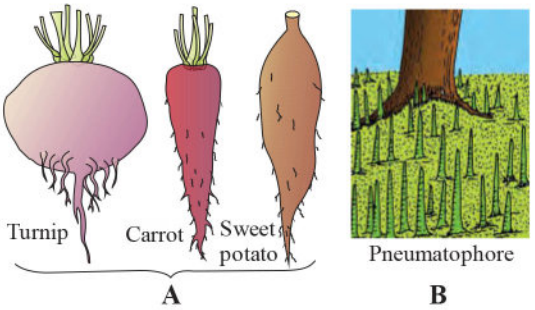
(a) Assertion and reason both are true and the reason is correct explanation of assertion.

(b) Assertion and reason both are true but reason is not correct explanation of assertion.

(c) Assertion is true but reason is wrong.

(d) Assertion and reason both are wrong.

Q.47 **The given figures (A and B) show the modificaiton of roots.Which of the following statements regarding the figures is correct ?**



A B

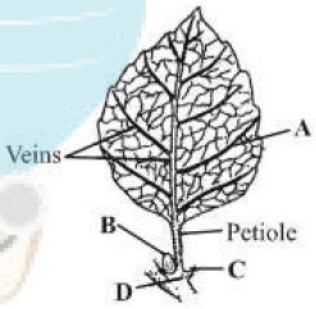
(a) Tap roots of carrot, turnip and adventitious root of sweet potato, get swollen and store food.

(b) Pneumatophores conducts water, minerals & photosynthesis

(c) Pneumatophore is found in the plants that grow in sandy soil.

(d) Turnip & carrot shows adventitious roots and sweet potato shows tap root.

Q.48 **Which of the following option shows the correct labelling of the parts of leaf marked as A, B, C and D.**



	A	B	C	D
(a)	Lamina	Axillary bud	Stipule	Leaf base
(b)	Lamina	Stipule	Axillary bud	Leaf base
(c)	Lamina	Axillary bud	Stipule	Pedicel
(d)	Leaflet	Axillary bud	Stipule	Leaf base

Q.49 **Identify the inflorescence shown by the given figures A and B.**

A B

(a) A-Cymose, B-Racemose

(b) A-Racemose, B-Cymose

(c) A-Racemose, B-Racemose

(d) A-Cymose, B-Cymose

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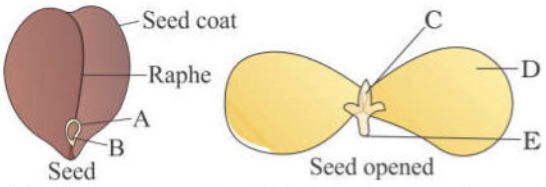
Q.50 **Which one of the options shows the correct labelling of the parts marked as A, B, C and D in a typical structure of dicotyledonous seeds ?**



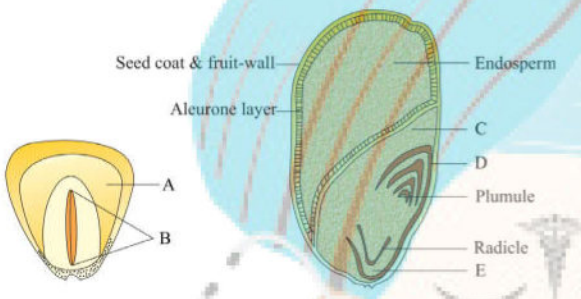
(a) A - Hilum, B - Micropyle, C - Radicle, D - Cotyledon, E - Plumule

(b) A - Hilum, B - Micropyle, C - Plumule, D - Cotyledon, E - Radicle

(c) A - Micropyle, B - Hilum, C - Plumule, D - Cotyledon, E - Radicle

(d) A - Hilum, B - Micropyle, C - Plumule, D - Radicle, E - Cotyledon

Q.51 **The given figure shows a typical structure of monocotyledonous seeds. Identify the parts A, B, C, D and E marked in the given figures.**



(a) A - Endosperm, B - Embryo, C - Scutellum, D - Coleorhiza, E - Coleoptile

(b) A- Embryo, B - Endosperm, C - Scutellum, D - Coleoptile, E - Coleorhiza

(c) A - Endosperm, B - Embryo, C - Scutellum, D - Coleoptile, E - Coleorhiza

(d) A - Embryo, B - Endosperm, C - Scutellum, D - Coleorhiza, E - Coleoptile

Q.52 **Most prominent function of inflorescence is**

(a) dispersal of seeds.

(b) formation of more fruits.

(c) formation of pollen grains.

(d) dispersal of pollens.

Q.53 **The character of flower which is represented by floral formula but not by floral diagram is**

(a) aestivation

(b) placentation

(c) position of gynoecium

(d) adhesion of stamen

Q.54 **Which characters for Phyllotaxy are incorrect from given characters?**

(i) **Phyllotaxy is the pattern of arrangement of leaves on the stem or branch.**

(ii) **In alternate phyllotaxy, a single leaf arises at each node in alternate manner.**

(iii) **Alternate phyllotaxy present in *Calotropis* and guava plants.**

(iv) **In opposite phyllotaxy, a pair of leaves arise at each node and lie opposite to each other.**

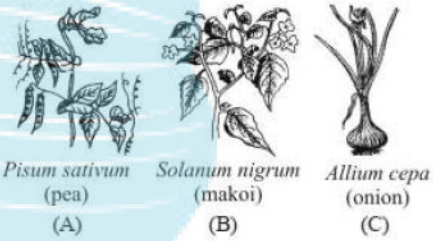
(v) **Opposite phyllotaxy present in china rose, mustard and sun flower plants.**

(vi) **Whorled phyllotaxy present in *Alstonia*.**

(a) (ii), (iv) and (vi) (b) (iii) and (v)

(c) (iii), (iv) and (v) (d) (iv), (v) and (vi)

Q.55 **Identify the correct families of the given plant species (A, B and C)**



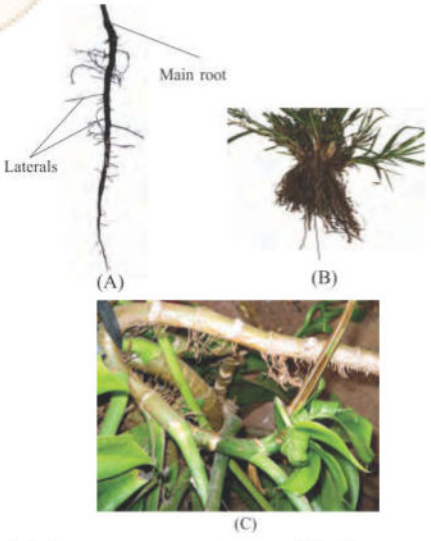
(a) A - Liliaceae, B - Compositae, C - Malvaceae

(b) A - Fabaceae, B - Solanaceae, C - Liliaceae

(c) A - Compositae, B - Malvaceae, C - Liliaceae

(d) A - Solanaceae, B - Fabaceae, C - Liliaceae

Q.56 **The given figure (A, B, and C) shows different types of roots. Identify the root which is seen in wheat plant and originate from the base of the stem?**



(a) A (b) B

(c) C (d) Both A and B

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Q.57 Floral features are mainly used in angiosperms identification because

(a) flowers are of various colours.

(b) flowers can be safely pressed.

(c) reproductive parts are more stable and conservative than vegetative parts.

(d) flowers are good materials for identification.

Q.58 Aleurone layer helps in

(a) storage of food in endosperm.

(b) protection of embryo.

(c) utilization of stored food.

(d) all of the above.

Q.59 Fibrous root system is better adopted than tap root system for

(a) transport of organic matter.

(b) absorption of water and minerals.

(c) storage of food.

(d) anchorage of plant to soil.

Q.60 Main function of leaf is

(a) exchange of gases

(b) increase the beauty of a tree

(c) manufacturing of food

(d) nerve impulse induction

Q.61 Rearrange the following zones seen in the regions of root tip and choose the correct option.

(A) Root hair zone (B) Zone of meristems

(C) Root cap zone (D) Zone of maturation

(E) Zone of elongation

(a) C, B, E, A, D (b) A, B, C, D, E

(c) D, E, A, C, B (d) E, D, C, B, A

Q.62 Which is not a stem modification ?

(a) Rhizome of ginger

(b) Corm of Colocasia

(c) Pitcher of Nepenthes

(d) Tuber of potato

Q.63 Ginger is an underground stem. It is distinguished from root because

(a) it lacks chlorophyll.

(b) it stores food.

(c) it has nodes and internodes.

(d) it has xylem and vessels.

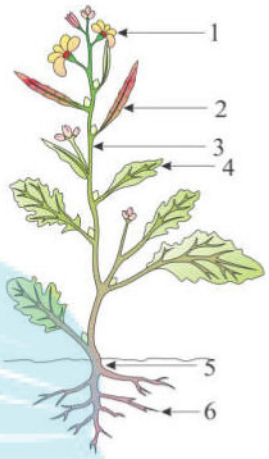
Q.64 The given figure shows the parts of flowering plant. Which parts of the given figure were involved in the following functions:

(i) Storing reserve food material

(ii) Synthesis of plant growth regulators.

(iii) Absorption of water and minerals from the soil.

(iv) Providing a proper anchorage to the plant parts



(a) 5 and 6 (b) 1, 2 and 6

(c) 1, 2, 3 and 4 (d) 2, 4, 5 and 6

Q.65 In flower (X), the gynoecium occupies the highest position while the other parts are situated below it. The ovary in such flowers is said to be Y. Identify X and Y and select the correct option.

	X	Y
(a)	Epigynous	Inferior
(b)	Perigynous	Superior
(c)	Hypogynous	Superior
(d)	Perigynous	Half-inferior

Q.66 Which of the following is not the characteristic features of fabaceae?

(a) Tap root system, compound leaves and raceme inflorescence.

(b) Flowers actinomorphic, twisted aestivation and gamopetalous.

(c) Stamens 10, introrse, basifixed, dithecous.

(d) Monocarpellary, ovary superior and bent stigma.

Q.67 How many plants in the list given below have marginal placentation?

Mustard, Gram, Tulip, Asparagus, *Arhar*, Sunhemp, Chilli, Colchicine, Onion, Moong, Sweet Pea, Tobacco, Lupin

(a) Four (b) Five

(c) Six (d) Three

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Q.68 Which of the following plant parts elongates directly and leads to the formation of primary roots?

(a) bud (b) radicle

(c) plumule (d) root hair

Q.69 Select the true statement.

(i) Epiphyllous when attached to the perianth as in the flowers of brinjal.

(ii) Monoadelphous stamens present in china rose.

(iii) Diadelphous stamens present in pea.

(iv) Polyadelphous stamens present in *Citrus*.

(v) In *Salvia* and mustard, variation in the length of filaments of stamens within a flower.

(a) (i), (ii) and (iii)

(b) (i), (ii), (iii) and (iv)

(c) (ii), (iii), (iv) and (v)

(d) All of these

Q.70 Fibrous root system is found in

(a) monocotyledonous plants.

(b) dicotyledonous plants.

(c) bryophytes.

(d) gymnosperms.

Q.71 Roots develop from parts of the plant other than radicle are called

(a) tap roots (b) fibrous roots

(c) adventitious roots (d) nodular roots

Q.72 Root hairs develop from

(a) region of maturation

(b) region of elongation

(c) region of meristematic activity

(d) root cap

Q.73 The part of the root which is most active in water absorption is called

(a) root cap

(b) maturation zone

(c) meristematic zone

(d) zone of elongation

Q.74 Which one of the following is correct explanation for the given floral formula ?

$\%\,\overset{\curvearrowleft}{\underset{+}{\bigcirc}}\,K_{(5)}C_{1+2+(2)}A_{(9)+1}\underline{G}_1$

(a) Zygomorphic, bisexual, sepals five and gamosepalous, petals five and papilionaceous, anthers ten and monadelphous, ovary superior and monocarpellary.

(b) Zygomorphic, unisexual, sepals five and gamosepalous, petals five and polypetalous, anthers nine united and one free, ovary superior and monocarpellary.

(c) Zygomorphic, bisexual, sepals five and gamosepalous, petals five and papilionaceous, anthers ten and diadelphous, ovary superior and monocarpellary.

(d) Zygomorphic, bisexual, sepals five and united, petals five and united, anthers ten and diadelphous, ovary superior and monocarpellary.

Q.75 The main function(s) of root system is/are

(a) absorption of water and minerals from the soil

(b) storing reserve food material

(c) synthesis of plant growth regulators

(d) All of the above

Q.76 Leaves of dicotyledonous plants possess _____ venation, while _____ venation is the characteristic of most monocotyledons.

(a) reticulate and parallel

(b) parallel and reticulate

(c) reticulate and perpendicular

(d) obliquely and parallel

Q.77 Which of the following is an example of pinnately compound leaf ?

(a) Cucumber (b) Papaya

(c) Cucurbita (d) Neem

Q.78 The main purpose of phyllotaxy for the leaves is to provide sufficient_____.

(a) soil (b) air

(c) water (d) light

Q.79 Alternate type of phyllotaxy is found in

(a) china rose (b) mustard

(c) sunflower (d) all of these

Q.80 Which type of function is performed by the fleshy leaves of onion and garlic?

(a) Storage

(b) Reproduction

(c) Photosynthesis

(d) Protection

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Q.81 **The flower is the reproductive unit in the _____ meant for _____ reproduction.**

(a) angiosperms and sexual

(b) gymnosperms and sexual

(c) algae and asexual

(d) pteridophytes and asexual

Q.82 **When a flower has both androecium and gynoecium, it is known as_____.**

(a) asexual (b) bisexual

(c) unisexual (d) multisexual

Q.83 **When a flower can be divided into two equal radial halves in any radial plane passing through the centre, it is known as**

(a) actinomorphic (b) zygomorphic

(c) asymmetric (d) bisymmetric

Q.84 **Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R :**

Assertion (A) : A flower is defined as modified shoot wherein the shoot apical meristem changes to floral meristem

Reason (R) : Internode of the shoot gets condensed to produce different floral appendages laterally at successive nodes instead of leaves.

In the light of the above statements, choose the correct answer from the options given below :

(a) A is true but R is false

(b) A is false but R is true

(c) Both A and R are true and R is the correct explanation of A

(d) Both A and R are true and R is NOT the correct explanation of A

Q.85 **Seeds are regarded as products of sexual reproduction because they**

(a) can be stored for a long time.

(b) are result of fusion of pollen tube.

(c) are result of fusion of gametes.

(d) give rise to new plants.

Q.86 **Which of the following is correct with reference to floral character of the family solanaceae?**

(a) Racemose, zygomorphic, unisexual, floral characters

(b) Racemose, zygomorphic, bisexual, polypetalous

(c) Axillary, bisexual, actinomorphic, epipetalous

(d) Axillary, actinomorphic, bisexual, epipetalous

Q.87 **Which of the following represents the floral characters of liliaceae?**

(a) Six tepals, zygomorphic, six stamens, bilocular ovary, axile placentation.

(b) Actinomorphic, polyphyllous, unilocular ovary, axile placentation.

(c) Tricarpellary, actinomorphic, polyandrous, superior ovary, axile placentation.

(d) Bisexual, zygomorphic, gamophyllous, inferior ovary, marginal placentation.

Q.88 **Assertion :** Tulip, *Gloriosa*, Aloe, *Asparagus* and *Colchicum autumnale* belonging to Liliaceae family.

Reason : Bisexual, actinomorphic, solitary/ cymose inflorescence, valvate aestivation and epiphyllous flower with capsule, rarely berry fruit and endospermic seedn is present in Liliaceae family.

(a) Assertion and reason both are true and the reason is correct explanation of assertion.

(b) Assertion and reason both are true but reason is not correct explanation of assertion.

(c) Assertion is true but reason is wrong.

(d) Assertion and reason both are wrong.

Q.89 **Root differs from stem in having**

(a) nodes and internodes (b) axillary buds

(c) multicellular hairs (d) unicellular hairs

Q.90 **Which of the following plant parts is generally green when young and later often becomes woody and dark brown?**

(a) stem (b) seed

(c) leaves (d) flower

Q.91 **The regions of the stem where leaves are borne are called _____ while _____ are the portions between two _____.**

(a) nodes, nodes and internodes

(b) nodes, internodes and nodes

(c) internodes, nodes and nodes

(d) internodes, internodes and nodes

Q.92 **Which of the following groups of plants have underground stems?**

(a) Potato, ginger, turmeric, Euphorbia, zaminkand

(b) Potato, ginger, turmeric, zaminkand, Colocasia

(c) Potato, Citrus, Opuntia, zaminkand, Colocasia

(d) Potato, cucumber, watermelon, zaminkand, Colocasia

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Q.93 **Stem tendrils are found in**

(a) cucumber (b) pumpkins

(c) grapevines (d) all of these

Q.94 **Match column-I with column-II and choose the option which shows their correct combination.**

Column-I	Column-II
A. Gamosepalous	I. Flower of lily
B. Polysepalous	II. Sterile anther
C. Gamopetalous	III. Free petals
D. Polypetalous	IV. Free sepals
E. Epiphyllous	V. Fused petals
F. Staminode	VI. Fused sepals

(a) A – IV, B – V, C – III, D – I, E – VI, F – II

(b) A – IV, B – III, C – V, D – I, E – II, F – VI

(c) A – VI, B – IV, C – III, D – V, E – I, F – II

(d) A – VI, B – IV, C – V, D – III, E – II, F – I

Q.95 **Matching colmun I with column II and choose the correct option.**

Column I	Column II
A. Coleorhiza	I. Grapes
B. Food storing tissue	II. Mango
C. Parthenocarpic fruit	III. Maize
D. Single seeded fruit developing from monocarpellary superior ovary	IV. Radicle
E. Membranous seed coat	V. Endosperm

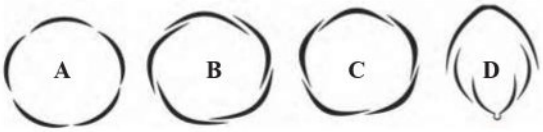
(a) A – III, B – I, C – IV, D – II, E – V

(b) A – IV, B – II, C – V, D – I, E – III

(c) A – V, B – I, C – III, D – IV, E – II

(d) A – IV, B – V, C – I, D – II, E – III

Q.96 **Identify the different types of aestivation (A, B, C and D) in corolla and select the correct option.**



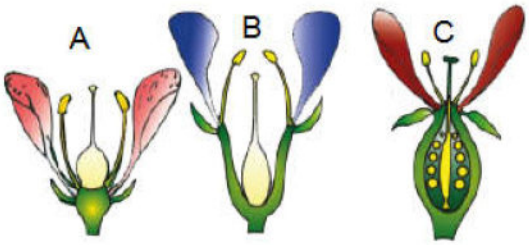
(a) A-Valvate, B-Twisted, C-Imbricate, D-Vexillary

(b) A-Vexillary, B-Valvate, C-Twisted, D-Imbricate

(c) A-Imbricate, B-Vexillary, C-Valvate, D-Twisted

(d) A-Twisted, B-Imbricate, C-Vexillary, D-Valvate

Q.97 **Given figures (A, B and C) show the position of floral parts on thalamus. (given as I, II and III) Select the correct combination.**



I. Hypogynous flower II. Perigynous flower III. Epigynous flower

(a) A-I, B-II, C-III (b) A-I, B-III, C-II

(c) A-III, B-II, C-I (d) A-III, B-I, C-II

Q.98 **Assertion :** A simple leaf has undivided lamina.

Reason : Leaves showing pinnate and palmate venations have various type of incisions.

(a) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.

(b) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

Q.99 **Assertion :** Ginger has a prostrate-growing rhizome.

Reason : Shoot growth is not effected by gravity.

(a) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.

(b) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

Q.100 **Assertion :** Many plants are propagated vegetatively even though they bear seeds.

Reason : Potatoes multiply by tubers, apple by cutting etc.

(a) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.

(b) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

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Solution

1. (b)

In maize, Pandamus, etc., adventitious roots develop from the lower nodes of the stem to provide mechanical support and are called stilt roots.

2. (d)

(i) The embryo is made up of a radicle an embryonal axis and one cotyledons in **wheat, maize** and two cotyledons in **pea, gram.**

(v) Seeds of castor is **endospermic** while seed of bean, gram and pea is **non-endospermic.**

3. (c)

(I) Cells of meristematic region of roots are very small, **thin walled** and with dense protoplasm.

4. (a)

Both statements are correct.

5. (a)

Bulb of onion is a modified stem.

6. (d)

When stamens are attached to the petals, they are epipetalous as in brinjal, or epiphyllous when attached to the perianth as in the flowers of lily.

7. (d)

Calyx or sepals are the outermost lower most nonessential but protective whorl of the flower. Sepals are green, leaf like and protect the flower in bud stage. When the sepals are free from one another, the calyx is said to be polysepalous (mustard) and when the sepals are wholly or partially united with one another by their margins then the calyx is said to be gamosepalous.

8. (b)

Valvate, twisted, imbricate and vexillary are types of aestivation.

A: Valvate aestivation - In this sepals or petals or tepals just touch one another without any overlapping, e.g. *Calotropis.*

B: Twisted aestivation - In this one margin of each petal overlaps the margin of an adjacent petal and the other margin being overlapped by margin of another adjacent petal, e.g. China rose, cotton.

C: Imbricate aestivation: If the margin of sepals or petals overlap one another but not in any particular direction as in *Cassia* and Gulmohar, the aestivation is called imbricate.

D: Vexillary aestivation - It is the characteristics aestivation of corolla of pea when posterior petal is outermost. E.g, bean.

9. (a)

When the incisions of the lamina reach up to the midrib breaking it into a number of leaflets, the leaf is called compound. A bud is present in the axil of petiole in both simple and compound leaves, but not in the axil of leaflets of the compound leaf. The compound leaves may be of two types. In a pinnately compound leaf a number of leaflets are present on a common axis, the rachis, which represents the midrib of the leaf as in neem.

10. (d)

Stem is the part of the plant that grows generally above the ground. Stems in some plants may undergo certain modifications to meet certain requirements.

Underground stem modifications include rhizomes, tuber, corm and bulb. These become swollen to store food. E.g. Potato.

Sub-aerial stem modifications include runners, stolon, offset and suckers.

Aerial stem modifications include stem tendrils, thorn and phylloclade. Stem tendrils are found in plants with weak stems. It is formed when axillary bud modifies to form green, thread-like sensitive structures with adhesive glands for fixation. E.g. Gourds (pumpkins, cucumbers, watermelons) and grapevines. They are stiff, pointed structures produced by modification of axillary buds. E.g. Citrus and Bougainvillea.

Phylloclade is a stem modified into a flat, fleshy and green leaf like structure. It carries out photosynthesis like leaves. E.g. They are thick, fleshy and succulent in Opuntia and cylindrical in Euphorbia and Casuarina.

11. (a)

The statements describe the phyllotaxy condition of plants. Phyllotaxy is the arrangement of leaves on an axis or stem. Phyllotaxy facilitate the leaves to obtain maximum light for photosynthesis.

12. (c)

Fruit is a mature or ripened ovary, developed after fertilization. When pericarp is thick and fleshy, it is differentiated into outer epicarp, middle mesocarp and inner endocarp. In mango and coconut, the fruit is known as a drupe.

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13. (c)

Tulip, Gloriosa, Aloe and Asparagus belong to family **liliaceae**. The plumule and radicle are enclosed in sheaths are called **coleoptile** and **coleorhiza** respectively.

14. (b)

Vexillary aestivation is found in papilionaceous family. In cymose type of inflorescence, the main axis terminates in a flower, hence is limited in growth. In parietal placentation ovary is one chambered but it becomes two cambered due to formation of the false septum.

15. (b)

Many plants belonging to the fabaceae family are sources of pulses (gram, arhar), edible oils (soyabean, ground nut), dye (indigofera), fibres (sun hemps), fodder (Sesabania), ornamental (lupin, sweet pea), and medicine (mulaithi).

16. (d)

Pea plant is an angiosperm, double fertilisation occurs in pea plants. Endosperm formed as a result of double fertilisation is used up by the developing embryo. This is why the mature seed of plants such as peas do not have endosperm in them.

17. (c)

In fabaceae ovary is present. Placentation is marginal with many ovules.

18. (c)

19. (a)

The figures show the types of placentation. Placentation is the arrangement of the placenta or placentae in the ovary of a flower. The function of placentation is to transfer nutrients from maternal tissue to a growing embryo.

A: Marginal placentation is found in monocarpellary ovary. In this ovary is unilocular and ovules arranged along margin of unilocular ovary. Examples - pea, Clitoria, groundnut.

B: Axile placentation is found in bi- or multicarpellary and multilocular ovary. Ovules are arranged along the central axis of placenta and the number of chambers corresponds to the number of carpels. Examples - lemon, tomato, Hibiscus, cotton.

C: Parietal placentation is found in bi- or multicarpellary ovary but unilocular. Ovules are arranged along periphery or the inner wall of the ovary, and number of placentae corresponds to the number of carpels. Examples, Cucurbita, Argemone.

D: Free central placentation is found in multicarpellary, syncarpous ovary. Ovules are borne along the central axis which is not connected with the ovary wall by septum. Example, Dianthus roam Primrose.

E: Basal placentation is found in monocarpellary but unilocular. In this placentation, the placenta develops at the base of the ovary and a single ovule is attached to it. Examples - sunflower, marigold.

20. (d)

Placentation – Arrangement of ovules within an ovary

Aestivation – Arrangement of sepals and petals in the floral bud

Inflorescence – Arrangement of flowers on the floral axis

Flower- Modified shoot for sexual reproduction

21. (a)

Phyllotaxy is the arrangement of leaves on a stem or axis. Phyllotaxy is usually of three types which are shown in the given figures A (alternate), B (opposite) and C (whorled). In alternate type, one leaf is borne at a node and leaves are arranged alternately giving a spiral form, e.g, mango, mustard and tobacco. In opposite arrangements, each node give rise to two leaves, arranged opposite to each other, e.g, Calotropis and guava plants. In whorled arrangement more than two leaves are formed from each node, e.g, Nerium.

22. (d)

In the given figure of flower, the structure marked as A, B, C and D are respectively gynoecium, stamen, ovule and thalamus. Gynoecium constitutes the inner essential whorl flower comprising carpels. Carpel is the unit of gynoecium. Each carpel contains ovary and stigma. Ovules are produced within ovary. Stamen is the male fertilizing organ of a flower, typically consisting of a pollen-containing anther and a filament. Ovule is the part of the ovary of seed plants that contains the female germ cell and after fertilization becomes the seed. Thalamus is an expanded tip of the pedicel. Components of whorls are concentrically arranged on a thalamus.

23. (a)

In mango and coconut, the fruit is known as drupe. Drupe develops from monocarpellary superior ovaries. In mango, the pericarp is differentiated into an outer thin epicarp, middle fleshy edible mesocarp and an inner stony hard endocarp. In coconut, the mesocarp is represented by the fibrous part.

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24. (b)

Thorn is a stiff, sharp-pointed woody projection on the stem or other part of a plant. Thorns are found in many plants such as Citrus, Bougainvillea. They protect plants from grazing animals.

25. (c)

A lateral branch with short internodes and each node bearing a rosette of leaves and a tuft of roots is found in aquatic plants like *Pistia* and *Eichhornia*.

26. (a)

In mint and jasmine, a slender lateral branch arises from the base of the main axis and after growing aerially for some time arch downwards to touch the ground.

27. (d)

Lamina on the leaf blade is usually flattened green photosynthetic part consisting leaf veins and veinlets. Its upper surface is called adaxial while the lower surface is called abaxial. The shape margin, apex, surface and extent of incision of lamina vary in different leaves.

28. (c)

Reticulate venation is the characteristic of dicots. In reticulate venation the main vein of leaf forms numerous irregular branches and as a result a net like arrangement is formed.

29. (a)

In parietal placentation, the ovules develop on the inner wall of the ovary or on peripheral part.

30. (b)

Androecium (male whorl) is composed of stamens. Each stamen which represents the male reproductive organ consists of a stalk or a filament or an anther.

31. (a)

A bud is present in the axil of petiole in both simple and compound leaves, but not in the axil of leaflets of the compound leaf. In *Australian Acacia*, the petioles expand, become green and synthesize food.

32. (d)

The zone of elongation region of a root increases length of the root. The external cells possess the power of absorption of water and minerals salts from the soil. The root hair zone represents the zone of differentiation or maturation because different types of primary tissues differentiate or mature in this region. Maize and sugarcane have stilt roots.

33. (c)

Simple leaf is a leaf whose blade is not divided to the midrib even though lobed. Simple is a leaf with entire lamina or when incised, the incisions do not touch the midrib. Testa is the outer layer of seed coat. It is thick, hard and leathery. Cacti are succulent plant with a thick fleshy stem which typically bears spines, lacks leaves, and has brilliantly coloured flowers.

Pitcher plants and Venus fly trap are insectivorous plants. They have modified leaves to catch insects. Garlic and onion have fleshy leaves which store food.

34. (a)

Staminode is a sterile or abortive stamen, frequently resembling a stamen without its anther.

35. (b)

Pollen grains are produced within the anther of stamen. Anther is the pollen-bearing part at the upper end of the stamen of a flower. Most anthers occur at the tip of a slender, stem-like filament and have two lobes. Each lobe contains two pollen sacs. When pollen matures in the pollen sacs, the lobes of the anthers burst open in the process known as dehiscence to release the pollen.

36. (d)

Gynoecuim or pistil is the female whorl that is differentiated into the ovary, style and stigma. Androecium is the male reproductive organ consisting of stamen. Each stamen is distinguishable into anther and filament joined by a connective.

37. (a)

During the post fertilization period, the ovules develop into seeds (A) and the ovary matures into a **fruit (B)**. Seed is a fertilized and ripened ovule and the characteristics of gymnosperms and angiosperms. Fruit is the part of a seed-bearing plant that contains the fertilized seeds capable of generating a new plant. Fruit develops from the female part of the plant. Apples, peaches, tomatoes, etc. are fruits.

38. (c)

Hilum is the scar on a seed marking the point of attachment of the developing seed vessel to the fruit.

39. (d)

Tomato and tobacco both belong to the family Solanaceae. Solanaceae has some identifying characteristics-bicarpellary, syncarpous superior ovary, axile plancentation, fruit is berry or capsule.

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40. (d)

The cells of the elongation zone gradually differentiate and mature. Hence, this zone proximal to the region of elongation, is called the region of maturation. From this region some of the epidermal cells form very fine and delicate, thread like structures called root hairs. Stems of maize and sugarcane have supporting roots coming out of the lower nodes of the stem called stilt roots.

41. (a)

Statements - i, ii, iii and iv are not correct.

(i) Calyx and corolla are helping or accessory whorls whereas androecium and gynoecium are reproductive organs of a flower.

(ii) Actinomorphic flowers can be divided into two equal radial halves in any radial plane and zygomorphic flowers can be divided into two similar halves in one particular plane.

(iii) Flowers without bracts are termed as ebracteate and flowers with bract, reduced leaf found at the base of the pedicel are called as bracteates.

(iv) Parthenocarpic fruit is formed without fertilization of the ovary.

42. (a)

Statement (i) and (ii) are correct about leaf.

(iii) Leaves originates from the shoot apical meristems and arranged in an acropetal order.

(iv) Leaves are the most important vegetative organs for photosynthesis.

43. (b)

According to the position of gynoecium, the flowers are of three kinds: perigynous, hypogynous and epigynous. The given statements describe the perigyny condition of flowers.

In perigynous condition of flower, the calyx, corolla and androecium arises from the around of ovary. In these flowers the ovary is semi inferior. e.g, plum, rose and peach.

44. (a)

45. (d)

When the calyx, corolla and androecium arise below the ovary, the flower is called hypogynous. In these flowers the ovary is superior, e.g., mustard, China rose and brinjal. In perigynous condition of flower, the calyx, corolla and androecium arise from the around of ovary. In these flowers the ovary is semi inferior, e.g., plum, rose and peach. When the calyx, corolla and androecium arise from the top of the ovary, the flower is called epigynous. In these flowers the ovary is inferior, e.g., guava, cucumber and the ray florets of sunflower.

46. (a)

Leaves are often modified to perform functions other than photosynthesis.

They are converted into **tendrils** for climbing as in peas.

Most species of cacti have lost true leaves, having only **spines,** which are highly modified leaves to reduce water loss, as well as defending against the herbivores.

47. (a)

Roots are modified in some plants to perform functions other than absorption and conduction of water and minerals. Figure A shows tap roots of turnip, carrot and adventitious roots of sweet potato and figure B shows pneumatophores in Rhizophora. Tap roots system is the characteristics of dicot plants. Tap roots (develop from radicle) and adventitious root (develop from any part of the plant other than the radicle) get swollen and store foods. Pneumatophore is a specialized structure developed from the root in certain plants growing in swamps and marshes. These types of roots come out of the ground and grow vertically upwards. Pneumatophore helps to get oxygen for respiration.

48. (a)

Leaf is the main photosynthetic organ of plants. In the given figure of leaf, the part marked as A, B, C and D are lamina, axillary bud, stipule and leaf base, respectively. Lamina or leaf blade is green and expanded portion of the leaf. In the middle of the lamina, a strong vein called midrib is present which extends from its base or apex. Axillary bud is borne at the axil of a leaf and is capable of developing into a branch shoot or flower cluster. Stipule is a small leaf-like appendage to a leaf, typically borne in pairs at the base of the leaf stalk. Leaf base is the lower part of the lamina, and is attached to petiole or stem.

49. (b)

In racemose inflorescence, the main axis continues to grow. The flowers are borne laterally in an acropetal succession, which means the older flowers are at the base and younger flowers are near the apex. E.g., radish, mustard, *Amaranthus*. In cymose inflorescence, the axis terminates in a flower, hence, is limited in growth. The flowers are borne in a basipetal order, which means older flowers are at the apex and younger flowers are near the base. E.g. cotton, jasmine, *Calotropis*.

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50. (b)

In the given figure of dicotyledonous seeds, the structure marked as A, B, C, D and E are respectively hilum, micropyle, plumule, cotyledon and radicle. Hilum is the scar on a seed marking the point of attachment of the developing seed vessel to the fruit. Micropyle is a small opening or pore present just below the hilum. It is the way of entry of water into the seed. Plumule is the developing bud of a plant embryo, situated above the cotyledons and consisting of the epicotyl and immature leaves. Cotyledon is an embryonic leaf in seed-bearing plants, one or more of which are the first leaves to appear from a germinating seed. Radicle is the first part of a seedling (a growing plant embryo) to emerge from the seed during the process of germination. The radicle is the embryonic root of the plant, and grows downward in the soil (the shoot emerges from the plumule).

51. (c)

In the given figure of monocotyledonous seeds, the structure marked as A, B, C, D and E are respectively endosperm, embryo, scutellum, coleoptile and coleorhiza. Endosperm is the part of a seed which acts as a food store for the developing plant embryo, usually containing starch with protein and other nutrients. Embryo is the part of a seed which develops into a plant, consisting (in the mature embryo of a higher plant) of a plumule, a radicle, and one or two cotyledons. Scutellum is the large shield like cotyledon of the embryo of certain monocots. It is specialized for the absorption of food from the endosperm. Coleoptile is the first leaf above the ground, forming a protective sheath around the stem tip. It surrounds the plumule. Coleorhiza is the sheath that envelops the radicle in certain plants and that is penetrated by the root in germination.

52. (b)

The arrangements of flowers on the floral axis (peduncle) are called as inflorescence. Most prominent function of the inflorescence is the formation of more flowers.

53. (c)

The character of flower which is represented by floral formula but not by the floral diagram is the position of gynoecium.

54. (b)

(iii) Alternate phyllotaxy present in **china rose, mustard** and **sun flower** plants.

(v) Opposite phyllotaxy present in ***Calotropis*** and **guava** plants.

55. (b)

The given plants A (*Pisum sativum*), B (*Solanum nigrum*) and C (*Allium cepa*) belong to fabaceae, solanacea and liliaceae families respectively.

56. (b)

Figure A, B and C are respectively tap root, fibrous root and adventitious root. The root branches of the primary root are called as Taproot system. The monocotyledons will have the primary root as shortlived and has many numbers of small lateral roots. These roots develop at the stem base and they form a root system called as fibrous root system, which is observed in the wheat plant (monocot). In some plants like banyan tree, monstera, and grass, parts of the plant other than radicle will be responsible for the development of root system called as adventitious root system.

57. (c)

The flower is the most characteristic structure of the angiosperms. It is a complex unit consisting typically of those parts which directly or indirectly contribute to the process of reproduction.

58. (c)

The major part of the grain is occupied by a large endosperm which is rich in starch. The endosperm has one to three layered peripheral protein layer called aleurone layer which separates the embryo with endosperm.

59. (d)

Fibrous root system is better adopted than tap root system for anchorage of plants to soil. In fibrous root system, the roots originate from the base of the stem. E.g, wheat plant. Tap root system is the primary root which is short lived and is replaced by a large number of roots (called fibrous root).

60. (c)

Leaf is a green, flattened outgrowth of the plant arising from the node of the stem and is specialized to perform the process of photosynthesis. Therefore, leaf is known as the kitchen or food factory of the plant.

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61. (a)

The correct sequence of the zones seen in the root tip is: CBEAD i.e. root cap zone, zone of meristems, zone of elongation, root hair zone and zone of maturation. Root cap zone protects the tender apex of the root as it makes its way through the soil. Zone of meristems have cells of very small size, thin walled and with dense protoplasm. They divide repeatedly. The cells in zone of elongation undergo rapid elongation and enlargement and are responsible for the growth of the roots in length. Root hair region is called the piliferous zone. In cell maturation zone, secondary growth takes place. It is the area of origin of lateral roots.

62. (c)

Underground stems of potato, ginger and *Colocasia* are modified to store food in them whereas leaves of certain insectivorous plants such as pitcher plant, venus-fly trap are modified leaves.

63. (c)

In roots, node and internodes are absent.

64. (a)

All the functions are carried out by the root system of the parts (marked as 5 and 6) of flowering plants. The flowering plant consists of an axis, root system and shoots system. The flowering plants consist of a long cylindrical axis which is differentiated into an underground root system. Root is the descending, non-green, underground part lacking nodes, internodes, leaves and buds. Root system consists of primary roots (5) and secondary roots (6). The main functions of the root system are absorption of water and minerals from the soil, providing a proper anchorage to the plant parts, storing reserve food material and synthesis of plant growth regulators. Shoot system is an aerial system, usually above the soil and originates from the plumule. It consists of flower (1), fruits (2), stem (3), leaves (4) and branches.

65. (c)

Hypogynous flowers (Superior ovary): In this, the ovary occupies the highest position on the thalamus, while other floral parts are situated below it. In such flowers, the ovary is superior. E.g., China rose, mustard, etc. Perigynous flowers (Half inferior ovary): In this, the ovary is situated at the centre and other floral parts are arranged on the rim of the thalamus. The ovary here is said to be half inferior. E.g., plum, rose, peach. Epigynous flowers (Inferior ovary): In this, the thalamus grows around the ovary fusing with its wall. The other floral parts are present above the ovary. Hence, the ovary is said to be inferior. E.g., flowers of guava and cucumber.

66. (b)

In fabaceae family, flower is zygomorphic, imbricate aestivation and polypetalous.

67. (c)

Marginal placentation is a placentation with ovules borne on the wall along the ventral suture of a simple ovary. Gram, arhar, sunhemp, moong, sweet pea & lupin belong to Fabaceae family that bears marginal placentation.

68. (b)

The direct elongation of the radicle leads to the formation of primary roots which grows inside the soil. The radicle is the first part of a seedling (a growing plant embryo) to emerge from the seed during the process of germination. The radicle is the embryonic root of the plant, and grows downward in the soil (the shoot emerges from the plumule).

69. (c)

(i) Epiphyllous when attached to the perianth as in the flowers of **lily.**

70. (a)

Fibrous root system is found in monocotyledonous plants. In monocotyledons, primary root is short lived and replaced by a large number of roots which originate from the base of the stem and constitute the fibrous root system.

71. (c)

Root developing from any part of the plant other than the radicle is called adventions roots. Adventitious roots are found in some plants like grass, *Monstera* and banyan tree.

72. (a)

Root consists of four regions: root cap, region of maturation, region of elongation and region of meristematic activity. Root hairs develop from the region of maturation. Region of maturation is the area of origin of lateral roots. Root hair region is called piliferous zone. This root hair absorbs water and minerals from the soil.

73. (b)

Water absorption takes place through root hairs. The latter are present only in the maturation zone.

74. (c)

The given floral formula in the question belongs to the family fabaceae. This family was earlier called Papilonoideae, a subfamily of family leguminosae.

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75. (d)

Root system generally grows beneath the ground into the soil. Functions of root system are as follows:

- It provides great anchorage and support to the plant. Huge trees such as mango, red wood stand erect due to the root.
- The root hairs absorb nutrients, water and oxygen from the soil and conduct them to the upper parts of the plant.
- Some of the tap roots are specially modified for storage of carbohydrates and water.

76. (a)

Leaves of dicotyledonous plants possess reticulate venation while parallel venation is the characteristics of most monocotyledonous. In reticulate venation, the main veins of leaf form numerous irregular branches and as a result a net like arrangements is formed. Reticulated venation is the most common vein formation in leaves. It can be found in the leaves of maple trees, oak trees and rose bushes. In parallel venation veins are arranged parallel to each other.

77. (d)

Pinnate are feather like leaves. The segmentation of the leaf-blade is towards the mid-rib, so that the leaflets are borne laterally on midrib or rachis. Example, Neem.

78. (d)

The arrangement of mature leaves on the stem or its branches is called phyllotaxy. These are meant for getting maximum amount of light for photosynthesis.

79. (d)

In alternate (or spiral) type of phyllotaxy, only one leaf is borne at each node and leaves are arranged alternatively giving a spiral form. Example china rose, mustard and sunflower.

80. (a)

In onion and garlic, scale - leaves store food and water and are, therefore, thick and fleshy.

81. (a)

The flower is the reproductive unit in angiosperms and is meant for sexual reproduction. Flower is the seed-bearing part of a plant, consisting of reproductive organs (stamens and carpels) that are typically surrounded by a brightly coloured corolla (petals) and a green calyx (sepals).

82. (b)

When both the essential whorls are present in the same flower, it is described as bisexual, e.g., cruciferae, malvaceae etc.

83. (a)

On the basis of symmetry, flower may be actinomorphic (radial symmetry) or zygomorphic (bilateral symmetry). In actinomorphic symmetry, flower can be divided into two equal halves in any radial plane passing through the centre. Examples - mustard, Datura and chilli.

84. (c)

85. (c)

Morphologically, seed (ripened ovule) is the integumented mature, megasporangium which is developed from a fertilized ovule and is with an embryo (future plant, enclosed by seed coat.)

86. (c)

Floral features of family solanaceae

Inflorescence: Solitary and axillary

Flowers: Actinomorphic, bisexual flowers

Calyx: Calyx is composed of five sepals that are united and persistent. Aestivation is valvate.

Corolla: Corolla consists of five united petals with valvate aestivation.

Androecium: It consists of five epipetalous stamens.

Gynoecium: It consists of bicarpellary, syncarpous superior ovary with axile placentation.

Fruits: Berry

Seeds: Numerous, endospermous

Floral formula: $\oplus \, ♀ \, ♂ \, K_{(5)} C_{(5)} A_{(5)} G_{(2)}$

87. (c)

Liliaceae is the characteristics of monocotyledonous plants. Floral characters of this family are: tricarpellary, actinomorphic, polyandrous, superior ovary, axile placentation.

88. (a)

Liliaceae Family

Commonly called the 'Lily family' is a characteristic representative of monocotyledonous plants. It is distributed world wide.

Vegetative characters: Perennial herbs with underground bulbs/corms/rhizomes

Leaves mostly basal, alternate, linear, exstipulate with parallel venation

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Floral characters

Inflorescence: solitary / cymose; often umbellate clusters

Flower: bisexual; actinomorphic

Perianth tepal six (3+3), often united into tube; valvate aestivation

Androecium: stamen six, 3+3, epitepalous

Gynoecium: tricarpellary, syncarpous, ovary superior, trilocular with many ovules; axile placentation

Fruit: capsule, rarely berry

Seed: endospermous

Economic Importance

Many plants belonging to this family are good ornamentals (tulip, Gloriosa), source of medicine (Aloe), vegetables (Asparagus), and colchicine (Colchicum autumnale).

89. (d)

A root differs from stem, without any exception, by the presence of unicellular root hairs and the absence of nodes and internodes.

90. (a)

Stem is generally green when young and later often become woody and dark brown. The stem bears buds which may be terminal or axillary.

91. (b)

A node is formed at the place from where a leaf arises, i.e., the place of origin of a leaf on the stem apex is differentiated as the node. The space between two successive nodes is called internode.

92. (b)

Underground stems are non green stems that may take part in perennation, store food or help in vegetative propagation. Underground stems of potato, ginger, turmeric, zaminkand, Colocasia are modified stem to store food in them.

93. (d)

Tendrils are spirally coiled, thread - like sensitive structures which develop from axillary buds and can coil around a support and help the plant in climbing. E.g., cucumber, pumpkins, water melon and grapevines.

94. (c)

A: Gamosepalous: Sepals united

B: Polysepalous: Sepals free

C: Gamopetalous: Petals free

D: Polypetalous: Petals united

E: Epiphyllous: Stamens are attached to the perianth as in flower of lily.

F: Staminode: A sterile or abortive stamen, frequently resembles a stamen without its anther.

95. (d)

Coleorhiza is the sheath that envelops the radicle in certain plants and that is penetrated by the root in germination. Endosperm is the part of a seed which acts as a food store for the developing plant embryo, usually containing starch with protein and other nutrients. Grape is a parthenocarpic fruit. Parthenocarpic fruit is formed without the fertilization in the ovary. Mango is a single seeded fruit developing from monocarpellary superior ovary. Maize has a membranous seed coat.

96. (a)

Aestivation is the arrangement of petals and sepals with respect to one another in a floral bud before it opens. The given figure shows different types of aestivation. Figures A, B, C and D show valvate, twisted, imbricate and vexillary aestivation. In valvate aestivation, sepals or petals or tepals just touch one another without overlapping, e.g. *Calotropis*. In twisted aestivation, one margin of each petal overlaps the margin of an adjacent petal and the other margin is overlapped by margin of another adjacent petal, e.g. China rose, cotton. If the margin of sepals or petals overlap one another but not in any particular direction as in *Cassia* and Gulmohar, the aestivation is called imbricate. Vexillary is the characteristics aestivation of corolla of pea when posterior petal is outermost.

97. (a)

Based on the position of floral parts on thalamus, flowers are divided into three types shown in the figures. Figures A, B and C are respectively hypogynous, perigynous and epigynous flower. When the calyx, corolla and androecium arise below the ovary, the flower is called hypogynous. In these flowers the ovary is superior. e.g., cruciferae, liliaceae. In perigynous condition of flower, the calyx, corolla and androecium arise around the ovary. In these flowers the ovary is semi inferior. e.g., plum, rose, peach. When the calyx, corolla and androecium arise from the top of the ovary, the flower is called epigynous. In these flowers the ovary is inferior. e.g., guava, cucumber and ray florets of funflower.

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98. (b)

A leaf having a single or undivided lamina is called simple leaf. The lamina can have different types of incisions, which may reach upto half (-fid), more than half (-partite) or near the base or midrib (-sect).

99. (c)

100. (c)

Plants do propagate more vegetatively since they multiply faster vegetatively.

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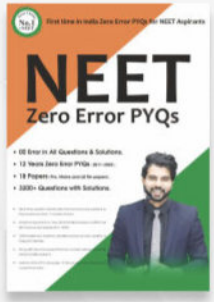

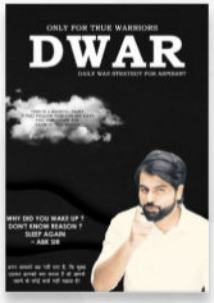

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Dr. Abhimanyu Kumawat

MBBS | Student coach | Exam Preparation Expert | Director at Cellsius Institute, Ajmer (Raj.) | Founder at NEET kaka JEE

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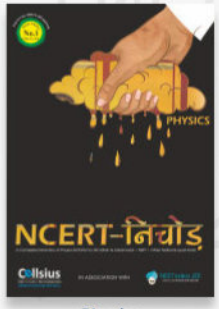
Nichod English



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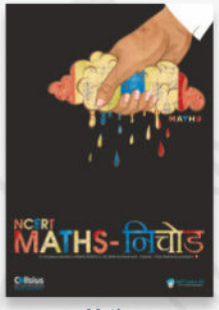

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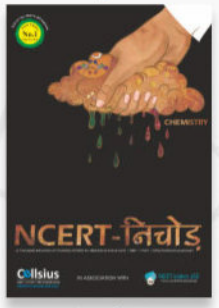

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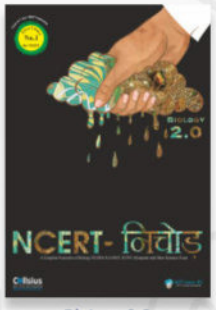
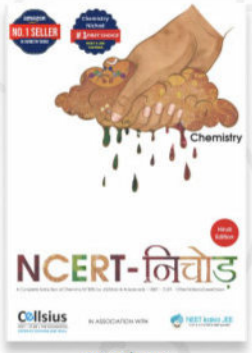


Biology 2.0

It has highly effective content to ensure multiple revisions for maximum retention which is key to success for cracking any exam. NCERT **Nichod** Biology is a self sufficient book and it's contents have been kept fabulously concise, beautifully summarised, amazingly consolidated and to the point to ensure multiple revisions.

Nichod Hindi



Chemistry

Biology

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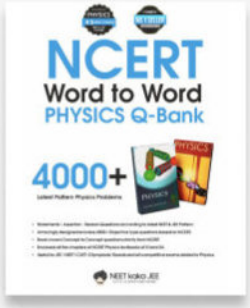

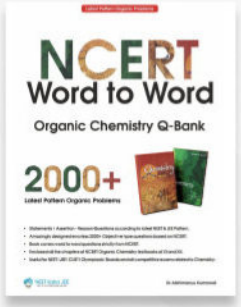

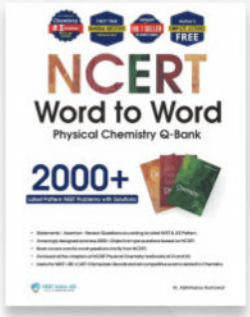

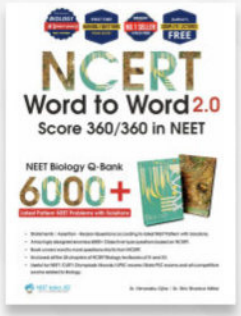

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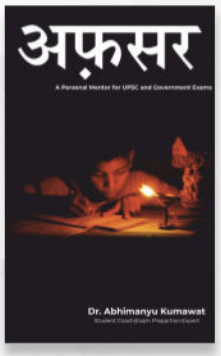

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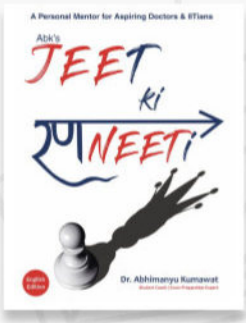

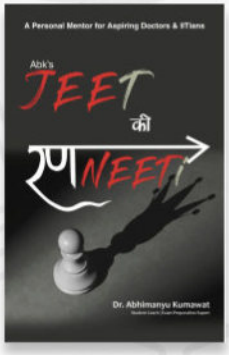
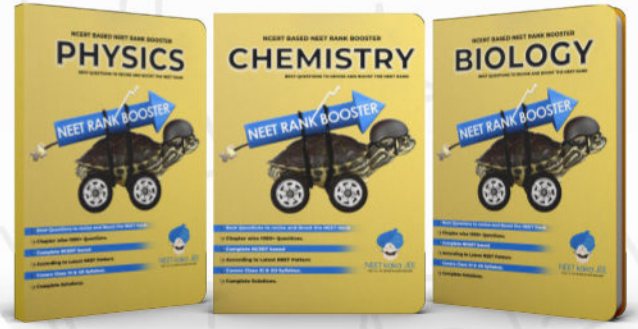
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